Boost Cloud and NFV Infrastructure Efficiency with Netronome SmartNICs and Red Hat Enterprise Linux and Red Hat OpenStack Platform

Communications Industry: Network Functions Virtualization (NFV) Infrastructure

80% of servers used in cloud and NFV infrastructures in 2019 will require hardware-based network and security processing offload and acceleration[1]

IMPENDING TSUNAMI OF CONTENT, DEVICES AND SERVICES

The proliferation of smartphone ownership, expansion of cell infrastructure, and vast adoption of mobile video will drive up mobile data consumption seven-fold by 2021[2]. This requires new data center buildouts that deliver significantly higher levels of CAPEX and OPEX savings. The growth of IoT, augmented reality and vehicle-to-infrastructure services will further exacerbate the need for new NFV infrastructure capabilities, such as network slicing and mobile edge computing.

Open source technology leaders Red Hat and Netronome offer a new cloud and NFV solution to boost efficiency for Red Hat Enterprise Linux (RHEL) and Red Hat OpenStack (RHOSP) users with wire-speed network throughput along with vastly reduced CPU overhead. Netronome's Agilio Ethernet SmartNICs fit conveniently into any COTS server and work seamlessly with RHEL and RHOSP to eliminate system bottlenecks that have delayed deployments and frustrated network operators.

Netronome is a leading provider of SmartNIC technology, having refined their programmable Network Flow Processor over multiple generations to deliver on-demand acceleration along with traditional Ethernet services. By working with the open source community to develop standard APIs for SmartNICs, Netronome and Red Hat combine to offer breakthrough efficiencies in data center and cloud-based computing.

SCALING THE CLOUD AND NFV INFRASTRUCTURE

The networking infrastructures that host cloud and NFV applications in a data center are built using x86 CPU-based COTS servers that run Linux and Open vSwitch (OVS) software. RHEL and RHOSP with TripleO orchestration have proven to scale in very large clouds. However, network processing in these environments can consume CPU cores, making servers and the networks that connect them inefficient. This problem becomes more acute as bandwidth increases to 25/40/50 and 100Gb/s.

Offloading network processing to Netronome's Agilio SmartNICs is the open source solution that overcomes performance and scalability bottlenecks that limit productivity. Using industry accepted APIs and Linux constructs with Agilio SmartNICs, servers running RHEL and RHOSP can transparently realize up to 20X efficiency gain in their infrastructure.

[1] Source: IHS Technology March 2017
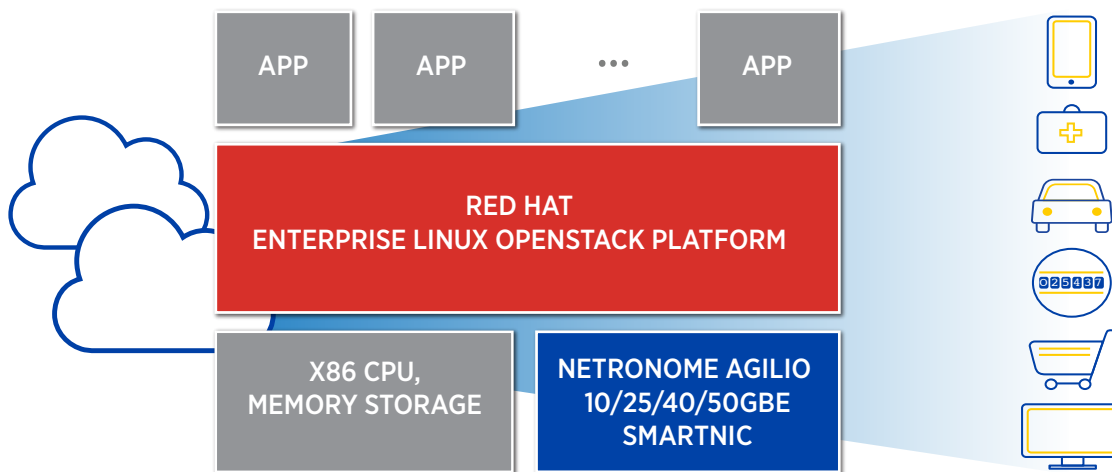[2] 2017 Cisco Mobile Visual Networking Index Forecast

Figure 1. The cloud and NFV infrastructure solution from Red Hat and Netronome allows data center operators to deliver new innovative services at a fraction of the cost

Red Hat Enterprise Linux (RHEL) OpenStack Platform: Red Hat's enterprise-grade platform forms the foundation for cloud and NFV infrastructure and enables users to benefit from the fast pace of open source project innovation while maintaining a stable platform for production deployment.

Netronome Agilio SmartNIC Platform: Built for accelerating SDN processing, the hardware component of the platform combines high-performance connectivity with programmability to facilitate fast feature innovation. Unlike expensive and inflexible FPGAs, Netronome's NFP-based Agilio SmartNICs can seamlessly transform from a traditional Ethernet NIC to a high-performance offload engine that transparently supports multiple acceleration use cases.

CUT DATA CENTER INFRASTRUCTURE COSTS

Servers, and the applications that run on them are the workhorses of the data center infrastructure. The ability to host them efficiently, including with adequate levels of agility, security and visibility, are paramount considerations as operators drive initiatives to offer more services to users at a higher quality of experience. The Red Hat and Netronome solution, when deployed on popular OEM and ODM-based servers, expands the capacity of each server rack, enabling more VMs and containers. At the same time, agility, security and visibility features delivered by the cloud infrastructure are maintained.

DELIVER NEW SERVICES WHILE BOOSTING QUALITY OF EXPERIENCE

Features like network slicing are imperative for delivering new services effectively for on-demand video, IoT, augmented reality and vehicle-to-infrastructure services for self-driving cars. With current networking technologies, such features cannot be delivered cost effectively and with desired quality of experience. The Red Hat and Netronome solution can deliver network slicing at scale without impacting server rack efficiency. The solution, using hardware acceleration on COTS servers, enables low and deterministic latency demanded by new services suitable for mobile edge computing. new services suitable for mobile edge computing.

CONCLUSION

Service providers and data centers deploying cloud-based technologies need to deliver next-generation services and contain costs to be successful in a highly competitive market. The Red Hat and Netronome cloud and NFV infrastructure solution allows service providers to build and deploy data center infrastructures with significantly higher levels of efficiency and performance, while maintaining the benefits of using popular COTS server hardware with comprehensive TripleO cloud orchestration.

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